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DOES USE OF TANGIBLE REWARDS WITH INDIVIDUAL CHILDREN AFFECT PEER OBSERVERS?[1]

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The common assumption that employing tangible rewards with individual children will have adverse effects upon peer observers was studied in the preschool setting. Multiple-subject, multiple-baseline procedures were applied to two classes of children, aged 3.5 to 6 yr. In each group, three consecutive children with low base rates of in-seat behavior received a verbal contingency and food rewards for sitting, while peers (with either low or high rates of in-seat behavior) received neither food nor teacher attention for sitting. Peer reactions measured were in-seat behavior, aggression, nonaggressive disruptive behavior, and complaints. The procedures neither decreased the in-seat behavior of peer observers, nor increased their aggressive or disruptive behavior. On the contrary, peers with low base rates of sitting initially displayed an abrupt, but temporary, increase in sitting. Moreover, although no compensatory attention was delivered, all children exhibited improved sitting by the end of the study. Complaints, which consisted mainly of requests for rewards, decreased in frequency with successive program phases, and within each phase. It is suggested that the class improvement in sitting behavior and the absence of negative effects on observers may be partially due to the high frequency of attention the teacher maintained for other desired behavior and the lack of attention to children's complaints.

DESCRIPTORS: effects of reinforcement, peer observers, preschool classroom, contingency contracting, sitting, classroom management, children, food as reinforcer

Although teacher attention and praise have often proved effective in classroom management (*e.g.,* Hall, Lund, and Jackson, 1968; Schutte and Hopkins, 1970; Thomas, Becker, and Armstrong, 1968), such social events are not sufficiently reinforcing for some children. To shape appropriate behavior of many of these less-responsive children, programs employing powerful tangible rewards have been shown to be more effective (*e.g.,* Levin and Simmons, 1962; Staats, 1965; Walker and Buckley, 1968). Teachers, however, are frequently reluctant to use tangible rewards with only one or two children for fear that perceived reward discrepancies will have adverse effects on the behavior of their classmates. The common assumption is that the unrewarded children will display a performance decrement or other "negative" behavior (McIntire, 1970; O'Leary, Poulos, and Devine, 1972). Despite the potential usefulness of individual management programs employing powerful tangible rewards, their impact upon peers' performance has not been systematically investigated.

Laboratory studies of the effects of observed social reinforcement have generally demonstrated that individuals who witness others rewarded for prosocial behavior subsequently emit the rewarded behavior (Bandura, 1971). Under

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certain conditions, on the other hand, observed reward has been shown to serve as a punisher. For example, Sechrest (1963) found that witnessing others praised for comparable performance on a problem-solving task decreased subsequent efforts of the ignored observers. Thus, the effects of observed reinforcement may be influenced by inferences the observer makes about his performance in relation to that of others.

Findings from the few classroom studies of the effects of observed social reinforcement are inconclusive. Two recent studies demonstrated that teacher attention for attending behavior of one child increased attending behavior of an adjacent child (Broden, Bruce, Mitchell, Carter, and Hall, 1970; Kazdin, 1973). Two other studies of differential teacher attention, however, did not find a significant effect on the behavior of observers (Carnine, Becker, Thomas, Poe, and Plager, *unpublished;* Ward and Baker, 1968).

Although the findings from these classroom studies fail to support the prevalent belief in adverse effects of individual reward programs, several reasons preclude their use as an adequate test of the assumption. First, the reinforcers employed were social rather than tangible, and the contingencies were not made explicit. Second, none of the observing children displayed a high base rate of appropriate behavior. In naturalistic situations, in which only selected children are receiving individual reward programs, it is probable that most other children are already performing at an acceptable level, and their witnessing a peer rewarded for lesser or equivalent performance may serve as a punisher. An adequate test of the above assumption, therefore, would require observing at least some unrewarded children with relatively high base rates of the prosocial target behavior. Third, teacher attention was undoubtedly available to the peer observers for other behaviors at other times, so that these children neither perceived nor experienced a reward discrepancy. Indeed, the teacher may have compensated for the extra attention to the target children by delivering increased attention to the other children at other times, thus eliminating cumulative reward discrepancies between children. A more adequate test would thus require that an attractive, easily noticed reinforcer be available only to the target child, and that his classmates receive no compensatory reinforcement.

The present study examined the nature and magnitude of effects of individual programs employing powerful tangible reinforcers on the behavior of each child in the group. Specifically, the study explored the effects of explicitly stated reward contingencies and food snacks for in-seat behavior upon three classes of response: aggression, nonaggressive disruptive behavior, and in-seat behavior in children with initially high or low rates of sitting behavior. The number and nature of verbal complaints and comments of the unrewarded children were also examined.

METHOD

Subjects

Eleven children formed two classes in a Weber State College remedial program for preschoolers with minor behavioral problems. Range of referral complaints included hyperactivity, overly demanding behavior, withdrawal, oppositional behavior, and speech disorders. The first group consisted of five children, four boys and one girl, with a mean age of 4 yr, five months. The second, a replication group, consisted of six boys with a mean age of 5 yr, five months. The teacher for both classes was a 21-yr-old female college senior.

Observation and Recording Procedures

The project took place in a classroom containing a 30 by 72 in. (76 by 183 cm) low table and six child-sized chairs. Child and teacher behaviors were observed during the same 20-min period each day, five days a week. Four observers, equipped with clipboards and data sheets, were seated approximately 4 ft (1.2 m) from

the children and from each other. They did not interact with the children or teacher, nor were they informed of the experimental procedures. The observers were trained for approximately three weeks before baseline while classroom procedures were the same as those during the baseline phase. One observer recorded in-seat behavior of each child in the group, another recorded both aggressive and disruptive behavior, a third recorded teacher behavior, and a fourth served as a reliability checker. The behavior category recorded by this fourth observer was randomly selected each day, and the other three observers were unaware of this selection.

In-seat behavior was defined as the child's having both buttocks in contact with the chair seat, shoulders above table-top level, and body trunk oriented within 90° of facing toward the table. Aggression was defined as disruptive acts directed toward others, such as hitting, pushing, spitting, throwing objects, grabbing another's property, and name-calling. Nonaggressive disruptive behavior was defined as disruptive acts not directed toward others, such as the child's slamming his own objects on the table and shoving or throwing those objects off the table (but not at another person). Also included as disruptive behavior were verbalizations loud enough to evoke a rebuke from the teacher. Teacher attention was defined as any verbalization directed to a child, physical contact with a child, or help given a child.

Child and teacher behaviors were continuously time-sampled in 10-sec intervals cued by tape-recorded numbers corresponding to numbered squares on the data sheets. These spoken numbers, audible to all, were designed to ensure simultaneous observation and recording of teacher and child behaviors. The observers recorded the coded initial of each child displaying a target behavior or receiving attention from the teacher during an interval. If none of the target behaviors occurred during an interval, a zero was marked in that square. Child complaints and comments about the reinforcement procedures during the experimental conditions were written verbatim in shorthand by the experimenter and also recorded on tape for later verification of the wording.

Reliability Estimates

The independent observer made a simultaneous record of each behavior category at least once during each phase of the study, and often two or three times during the longer conditions. As recommended by Hartmann (1972) for studies in which human observers collect the data, two types of interobserver agreement were measured, trial or within-session reliability and between-session reliability. As an estimate of trial reliability, phi coefficients were calculated on the 2×2 tabled data. As an estimate of between-session reliability, the Pearson correlation coefficient (r) was computed using each observer's total scores for sessions in which reliability checks were made.

Experimental Design and Procedure

A multiple-subject, multiple-baseline design was used for both groups. Three children in each group, one at a time, received a verbal contingency and edible rewards for in-seat behavior. The remaining two children in Group 1 and three in Group 2 did not receive contingent events for sitting during any phase of the study. The only procedural difference between the two groups was the omission of a second baseline condition for Group 2, as time did not permit inclusion of this reversal phase.

General Procedure

The activity for both classes was working with clay: a plastic pot with plasticene clay and a modelling stick were placed on the table beside each child's name. Seat locations were rotated daily to control for possible effects of differential proximity to the rewarded child. The children were free to model any clay object they wished. During sessions, the teacher walked around the table engaging the children in conversation, offering suggestions, demonstrating, helping upon request, and praising the chil-

dren's efforts. At no time did the teacher ask a child to sit, or praise or comment on the sitting behavior of any observing child. After a session, the teacher was often given feedback on the amount of attention delivered to each child.

Baseline$_1$

Baseline conditions were continued in each group until the most irregular pattern of in-seat behavior met the criterion recommended by Gelfand and Hartmann (1975, ch. 8): three data points plus one additional data point for each 10% of variability.

Contract$_1$

Following the baseline period, the teacher verbally introduced the contingency for a child who exhibited a relatively low rate of in-seat behavior as follows: (Addressing the group) "Everybody listen. I'm going to make a deal with [*Child's name*]." (Addressing target child) "_____, if you are sitting in your seat when the whistle blows, you'll get a goody. A goody is a piece of candy, or raisin, or nut, or marshmallow." (Pointing to tape recorder) "The whistle blows from this box. Every time you're sitting in your seat—all the way down and facing front—when the whistle blows, you get a goody." (If the child was not in his seat or was not sitting as defined, the teacher guided him into his seat and positioned his body as she verbalized the contingency.) She then started the tape that signalled reward intervals and that emitted a tone of 2.8 Hz on a variable-interval schedule with a minimum interval between tones of 15 sec, a maximum of 85 sec, and a mean of 60 sec. When the tone sounded, she took an edible from her apron pocket and popped it into the child's mouth, saying, "Here's your goody for sitting." A similar comment was made each time the child was rewarded; nothing was said when he had not earned a reward.

Baseline$_2$

A reversal was implemented for Group 1 in which the program for Child A was withdrawn and no contingency was in effect. On the first day of this reversal, the teacher responded to questions by saying only, "I don't have any goodies."

Contract$_2$ *and* $_3$

Procedures for the second and third contract conditions were identical to those for Contract$_1$, but with different target children.

RESULTS

Reliability

Mean interobserver agreement values of within-session reliability estimates (phi coefficients) for all child behaviors ranged from 0.91 to 1.00, with the majority of values falling in the high 0.90s. Correlations for between-session estimates (Pearson *r*'s) for these same behaviors ranged from 0.96 to 1.00. For teacher attention, within-session means ranged from 0.84 to 0.99, and between-session correlations, from 0.94 to 0.99.

In-Seat Behavior

Figure 1 presents, for each session, the percentage of intervals the five children in Group 1 were in-seat. The effectiveness of the experimental manipulation for Child A is evident in the dramatic rise in sitting when the reward program was introduced, the maintenance of this high level throughout the entire phase, and the subsequent return to near baseline level when the program was withdrawn. With the onset of Child A's program, Children B and C displayed an abrupt rise in in-seat behavior, but the level for neither child reached that for Child A. Further, this increase was only temporary; sitting returned to its previous level on the second day for Child B and on the third day for Child C. Both B and C displayed a slightly elevated level of in-seat behavior during the second baseline phase in which no rewards for sitting were delivered to any child. Children D and E, both of whom displayed a relatively high base rate of sitting, maintained this behavior during the first three phases.

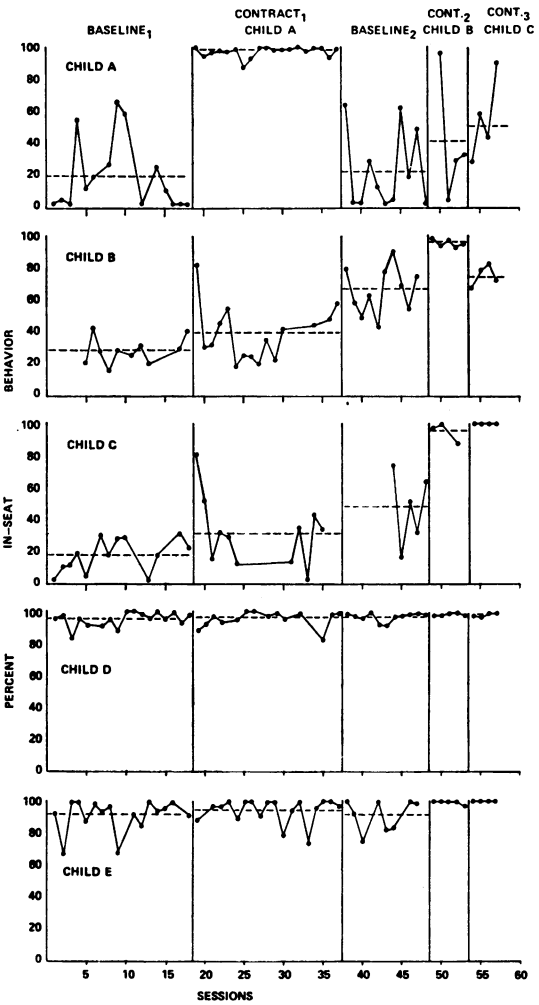

Fig. 1. Percentage of 10-sec intervals Group 1 children were in-seat during a daily 20-min session.

When Child B received a program (Contract2), his sitting rose abruptly and remained at near maximum level throughout the phase, again indicating the reinforcing effect of the food consequences. When Child B's program was introduced, Child A exhibited the sudden, temporary increase in sitting that characterized the behavior of both B and C upon first witnessing a peer program in Contract1. Interestingly, Child C showed a second abrupt rise in in-seat behavior, this time to near maximum level, and maintained a high response rate the remaining two sessions he was in attendance.

When Child C obtained a program (Contract3), he remained in his seat for the entire session each day. Child A failed to exhibit the abrupt rise in sitting previously shown, but displayed an upward trend during this phase. Children D and E both displayed decreased variability and extremely high rates of sitting during the final two phases.

As a check on the replicability of the preceding results, the verbal contingency and reward procedure was applied to a second group of children. Figure 2 presents the in-seat data for these six children. With the onset of Child F's program (Contract1), H displayed the sudden marked, but temporary, increase in sitting that typified the behavior of the Group 1 children (A, B, and C) when a peer's program was initiated. (This effect was not obtained for Child G, whose sitting had already reached maximum level during the final three sessions of the baseline phase. The great variability displayed by G is partly due to the restricted definition of "in-seat" used in the study. (He frequently crouched on his heels in the chair, and this position, by definition, was out-of-seat.) With the initiation of G's program (Contract2), Child H's failure to exhibit an immediate increase in sitting was similar to the behavior of Child A upon witnessing a second peer rewarded. The in-seat behavior of the three children in Group 2 (I, J, and K) who received neither food nor praise for sitting, appeared to stabilize even more rapidly than that of the two children in Group 1 (D and E) who never obtained rewards for sitting, showing decreased variability and asymptotic responding during the three contract phases.

The children had 27 opportunities to alter their sitting behavior as a result of witnessing peer programs; there were no instances of a marked decrement in in-seat behavior. On the contrary, upon first witnessing a contingency and rewards delivered to a peer, four of the five children with relatively low base rates of sitting exhibited a marked, although temporary, increase in in-seat behavior. (Child F in Group 2 had no opportunity to show a response incre-

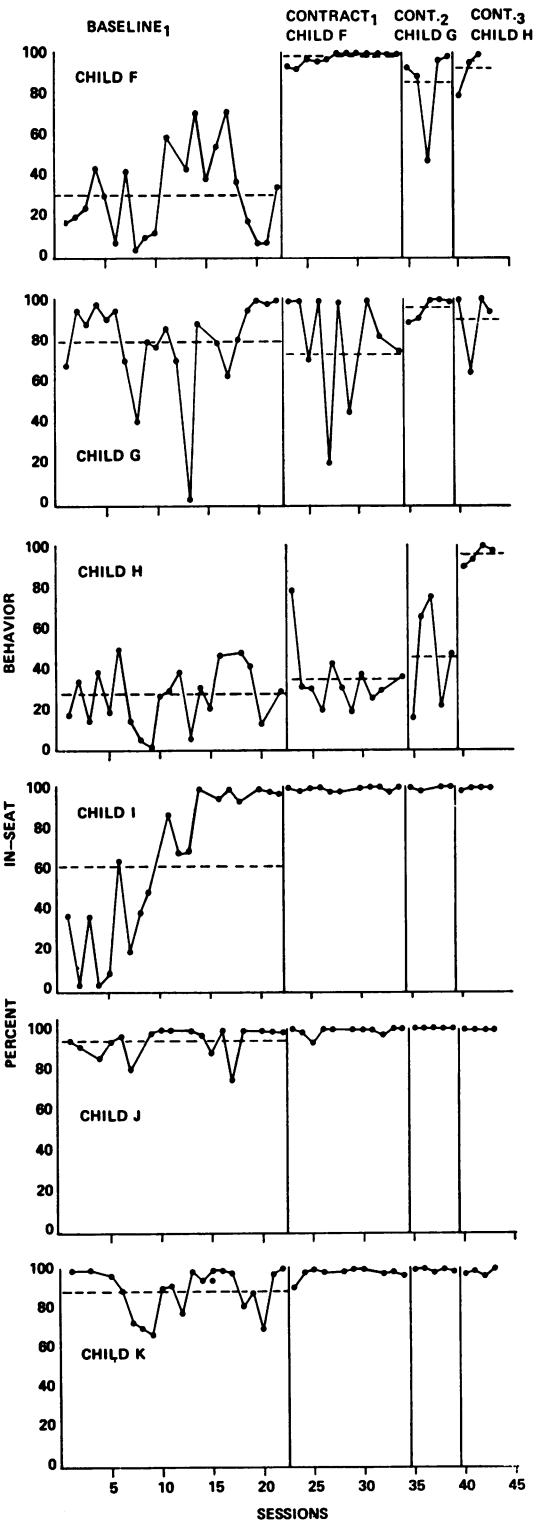

Fig. 2. Percentage of 10-sec intervals Group 2 children were in-seat during a daily 20-min session.

ment because his sitting was already at maximum level after being rewarded.) Moreover, only two of the 11 children (E and G) did not display successive increases in in-seat behavior in successive phases in which they were not rewarded for sitting. Finally, compared with their initial baseline levels, all children exhibited either an increased rate or decreased variability in sitting during the third contract phase.

To check on the possibility that the teacher was compensating for the lack of edible rewards to the peer observers by giving them additional attention during the scheduled phases, the data on teacher attention were examined for both the total intervals and those intervals in which each child was recorded as in-seat. These data revealed that the mean percentage of total intervals the teacher delivered attention to each peer observer during contract phases was not greater than the mean percentage of intervals she delivered attention during baseline phases. Further, although the mean percentage of *in-seat* intervals the teacher delivered attention increased for five of the six target children during their own program phase, this percentage did not increase for any of the observing children during contract phases. The teacher never attended to the sitting behavior of any observing child.

Aggression and Disruptive Behavior

Data on both aggression and nonaggressive disruptive behavior were examined, and neither trends nor condition differences were present. Frequencies of behaviors in both categories remained low throughout the study.

Child Verbalizations

Child verbalizations regarding the experimental procedures were classified by two independent raters into two categories: complaints and comments. Complaints included criticisms of the procedures (*e.g.,* "It's not fair", "I'm sitting too!"), and requests, either direct or implied, for a program (*e.g.,* "Tomorrow make me a deal", "I like raisins."). Comments were defined

as all verbalizations regarding the procedures other than those classified as complaints, and included questions or statements about the reward (*e.g.*, "What are you giving him?"), the whistle (*e.g.*, "There went the whistle."), and the target child's sitting behavior (*e.g.*, "He's out of his chair; he doesn't get a goody."). The raters agreed in their assignment of 214 of 216 verbalizations.

Figures 3 and 4 present the number of daily complaints (consisting almost entirely of requests for rewards) and comments by each child for each contract condition and, for Group 1, the second baseline condition. These data reveal that one child of five in Group 1 (Child D) and three children of six in Group 2 (F, G, and I) never complained. For six of the seven children who did complain, the number of complaints per session decreased with successive treatment phases. Complaints were most frequent on the first day of each treatment phase and declined to zero within the phase. Interestingly, the two children in Group 1 (A and B) who had their programs withdrawn, emitted more complaints during the first day of withdrawal than during a session when they only observed another child rewarded. It is also interesting that the child in each group (C and K)

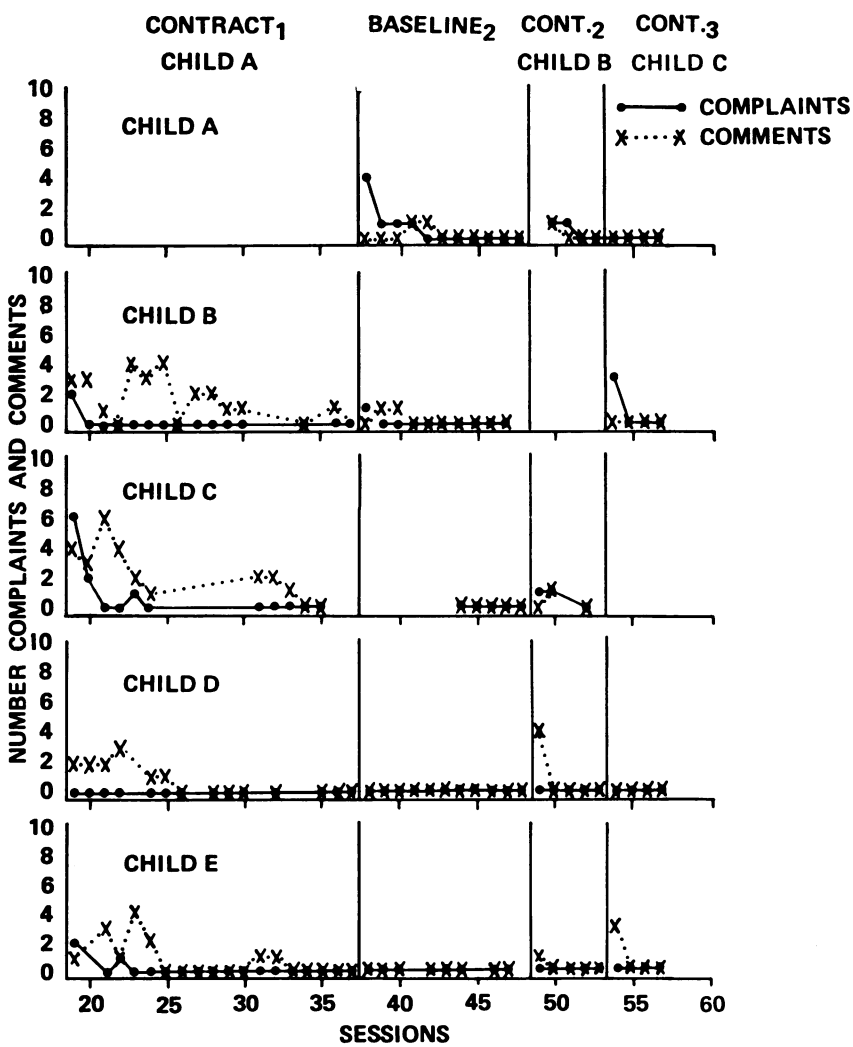

Fig. 3. Number of complaints and comments by the Group 1 children during a daily 20-min session.

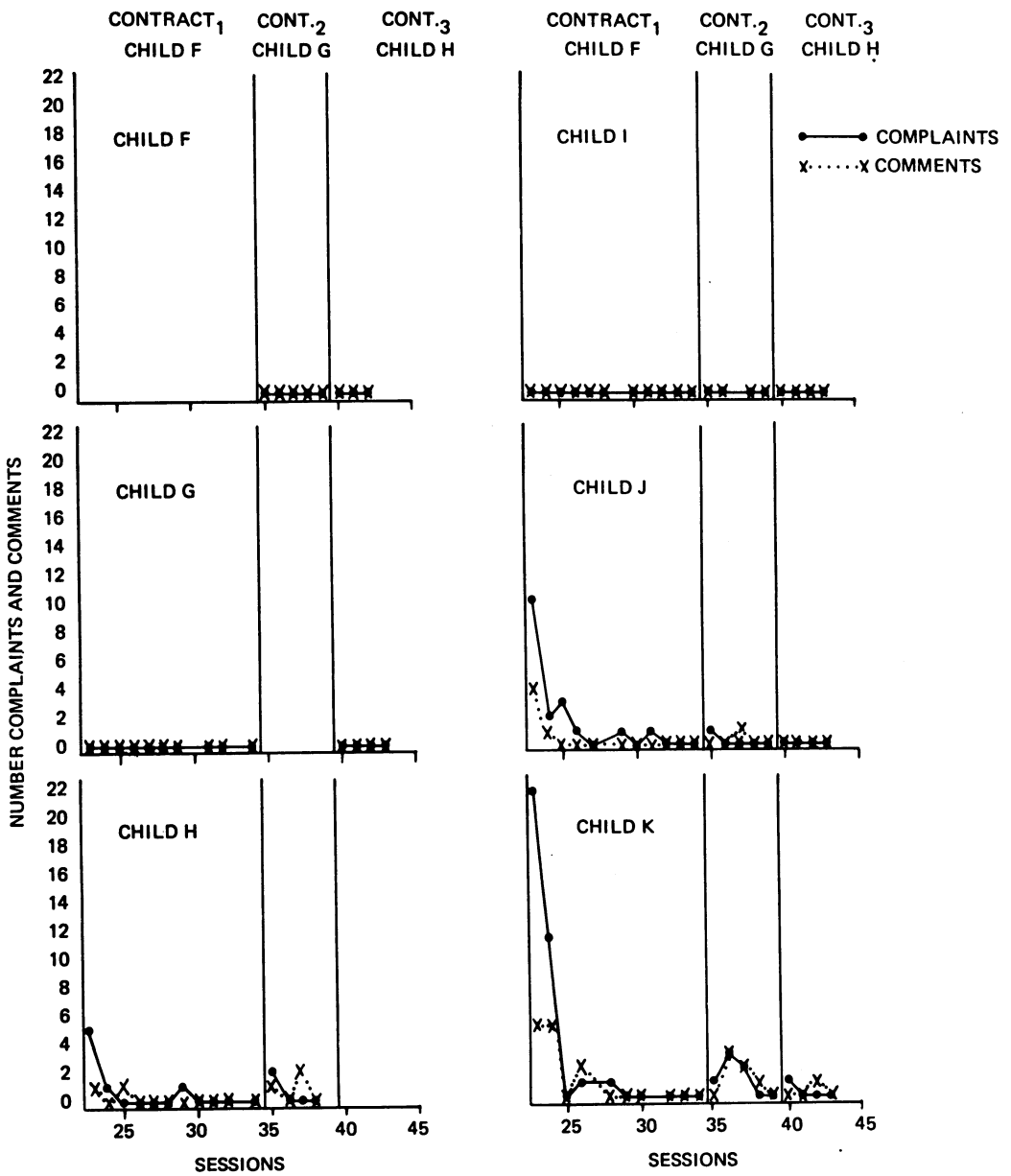

Fig. 4. Number of complaints and comments by the Group 2 children during a daily 20-min session.

with the highest number of complaints had been previously expelled from other educational settings, and one reason reported in each case was overly demanding behavior. Only these two children had been expelled for badgering a teacher.

DISCUSSION

The use of verbal contingencies and food rewards with individual children was an effective management procedure that did not decrease performance in the observing children. On the contrary, as compared to initial baseline rates, all 11 children displayed either increases in the target behavior or decreased variability by the final phase of the study, and for the children with relatively low base rates of sitting, the increases were marked. Further, witnessing peer contingencies and reward resulted in increases

in neither aggression nor disruptive behavior. Verbal complaints consisted almost entirely of requests for rewards, and they decreased in frequency with successive contract conditions and declined to zero within each condition. Apparently, these children were not acting "negatively" in response to perceived reward discrepancies.

The overall improvement in in-seat behavior in both classes during the study may have several explanations. First, the children received teacher attention for working with clay, and it seems reasonable that while working, they were more comfortable sitting than crouching or standing. Second, several children in Group 2 implied by their comments to each other (*e.g.*, "It's still _____'s deal.") that they might have expected to take turns in receiving a contract, despite the fact that the teacher never stated nor implied that subsequent programs would be initiated. It may be speculated that these children were displaying good behavior so they would receive the desired reward; this strategy would contradict, again, the prevalent notion that children will display bad behavior in order to "force the teacher's hand".

The lack of performance decrement for the children with high base rates of sitting is not in accord with Sechrest's (1963) finding, nor does it support predictions from equity theory (Adams, 1965). Any efforts to achieve equitable performance-reward ratios by the underrewarded children appeared to take the form of verbal requests for rewards, rather than a reduction in in-seat behavior. It may be assumed, however, that sitting was relatively effortless for the high base-rate children. Another study is needed to determine whether or not a performance decrement would occur if the target behavior were an effortful, academic task.

The abrupt increase in in-seat behavior displayed by the low base-rate children upon first witnessing a peer program is in accord with the literature on observed social reinforcement. This increase may be explained in terms of discriminative stimulus control in which the verbal contingency, modelling by the target child, and/or rewards may have served as cues for possible response consequation. The design of the study precludes analysis of the relative contribution of each of these variables to the observed effect.

The transitory nature of this marked increase in in-seat behavior by these low-rate children differs from the sustained increase in target behavior found in both the Broden *et al.* (1970) and Kazdin (1973) studies. The tangible reinforcers used in the present study, as contrasted with praise employed in the previous studies, may have allowed the children to discriminate more readily whether these rewards were directed to themselves or to a peer. Also, the teacher's response to initial requests for reward ("I have a deal with _____") implied that edibles would be delivered only to the designated child. Thus, when increased sitting behavior was not functional in obtaining the desired reward, it was not sustained.

Several factors dictate caution in generalizing the present findings to other subjects and settings. The results may have limited applicability to older children because they have had more exposure to reward discrepancies, and may have learned to protest such inequities more vigorously than have preschool children. Evidence that preschool children attempt to obtain equitable reward, however, has been found in previous studies (Masters, 1968; 1969) in which underrewarded, as compared with equitably rewarded, 4-yr-olds subsequently engaged in greater self-reward.

Other limiting variables may be class size and teacher skill. It might be important that the teacher maintain a moderately high rate of attention to the observing children for either the target or other appropriate behavior, and the larger the group, the more difficult may be the teacher's task. The larger the class, also, the greater may be the children's difficulty discriminating both social and tangible rewards by the teacher. Further, the peer group may stimulate and reinforce each other's protests, and the larger

the group, the greater would be the opportunity for expressions of peer support for those complaints. Indeed, the apprehension of teachers to initiate individual programs may stem from concern with their own ability to deal with the complaints of the peer observers. Thus, it may be advisable that teachers seek consultation on extinction methods before implementing individual management programs using tangibles.

Finally, the present results were obtained in a remedial classroom that possibly provided certain cues or contingencies not present in a regular classroom. Replication of the procedures in a regular classroom is warranted.

Despite such possible limitations of the generalizability of the present findings, the results are encouraging. It appears that if child observers receive frequent teacher attention for desired behavior, and if their verbal requests for reward are consistently ignored, employing contingencies and tangible rewards to shape appropriate behavior with selected children may have beneficial effects on the behavior of both the target children and their classmates.

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